fulfilled the dimensional criteria. By measurement of flow rates and viscosities in a model, he determined the equivalent viscosity for the sediments arriving at a value which is in reasonable accord with determinations by other means. The experiments by Griggs and the thermodynamic development of the physics of stressed solids by Goranson in recent years have interpreted the physical properties of rock material, in terms of long time stresses. This work has clarified and evaluated certain fundamental properties such as "strength," "plasticity," etc. that are directly applicable to the fluid mechanical postulate of salt-dome formation. Finally, recent extensive geophysical work and drilling around salt domes have revealed the frequent existence of rim synclines which are a natural consequence of the fluid-mechanical theory and which were relatively unknown or unrecognized as such at the time of the earlier paper. All of this work seems to confirm the general hypothesis that salt-dome formation is largely a fluid-mechanical process.

A dynamic model illustrating the fluid mechanics of dome formation will be available when the paper is given, and it is hoped it can be seen in operation in connection with other exhibits of the convention.

22. R. DANA RUSSELL, Louisiana State University, Baton Rouge, Louisiana
Salt Domes of Bienville Parish

The salt domes of Bienville Parish, Louisiana, are classic examples of the shallow or piercement-type dome, and have been prominent in the geologic literature of the Gulf Coast since the discovery of Cretaceous fossils at King's Dome in 1867.

Detailed surface mapping shows the domes to be round to oval in plan, with progressively younger sediments exposed in concentric rings outward from a central depression. Rim synclines and partial rim anticlines are also evident. Deformation of Pleistocene deposits serves to date the last period of uplift on most of the domes.

Neither the ring of upturned sediments nor the adjoining anticline has been adequately explored by drilling on most of the domes, so they may still be considered as potential producers.

23. PAUL WEAVER AND COMMITTEE, Gulf Oil Corporation, Houston, Texas
JOHN S. IVY, Geologist, Houston
D. PERRY OLCOTT, Humble Oil and Refining Company, Houston
JOHN M. VETTER, Pan American Prod. Company, Houston
GEORGE S. BUCHANAN, Consulting, Houston
Statistical Analyses of Crude Oils of Tertiary Age in the Gulf Coast of Texas and Louisiana as They Vary with Depth, Producing Formations, and Structural Types

24. FREDERIC H. LAHEE, Sun Oil Company, Dallas, Texas
Discovery Rate and Relation of Wildcatting to the Discovery of New Reserves

The total number of wildcats drilled in 1941, in the states covered by this report, was 3,264, and the footage drilled was 11,615,085, as contrasted with 3,038 holes and 10,144,870 feet, respectively, in 1940. The average depth of hole increased from 3,339 feet to 3,559 feet for all states covered, and from 4,209 feet to 4,372 feet in the southern states.

This résumé on wildcatting is followed by a study of discovery rate in the eleven states of Arkansas, California, Illinois, Indiana, Kansas, Louisiana, Michigan, Mississippi, New Mexico, Oklahoma, and Texas. Discovery rate is measured by the relations between wildcatting and the discovery of new reserves during the last half decade. Except for a slight rise, in 1941, in the curves expressing rate of discovery, there has been a decline since 1937.

25. F. M. GETZENDANER, Consulting Geologist, Uvalde, Texas
Problem of Pre-Trinity Deposits in South Texas

Probability of Permian deposits in the East Texas basin is suggested. Attention is directed to the new section of Jurassic, Neocomian, and Trinity deposits in the region of East Texas, Louisiana, and Arkansas, arranged by the Shreveport Geological Society and Ralph W. Imlay, with new names for some of the formations; and the presence of Jurassic deposits in Limestone County, Texas, on the west side of the basin.

Evidence is presented of the progressive increase in basinward slopes on the basement and dips on the sedimentary beds, westward across Arkansas and East Texas, thence southwestward to the locality of San Antonio, thence continuing westward again to the Rio Grande. For this 700 miles of generally uniform trend it is postulated that the

slopes and dips are functions of sediment load. In general, the greater slopes and dips are toward localities of greater loads of sediments within the basin. The conclusion is that, at comparable locations with reference to the shore, the pre-Trinity deposits in South Texas are thicker than in East Texas, Louisiana, and Arkansas.

Some criteria are suggested for locating the Jurassic shore line. Importance for possible oil and gas production along the continental shore, and the shores of peninsulas and islands, is stressed. Probability of the presence of undiscovered salt domes in South Texas is pointed out.

26. JAMES L. TATUM, Plymouth Oil Company, Sinton, Texas
JARVIS GARST, Plymouth Oil Company, Sinton, Texas
Plymouth Field, San Patricio County, Texas

The Plymouth oil field is located in northeastern San Patricio County, Texas, in the Coastal Bend province of the Gulf Coastal Plain. The discovery well was completed in April, 1935, in the Plymouth or 5,500-foot sand. Reflection seismograph led to the discovery. One hundred eighty-eight wells have been completed as of January 1, 1942. The field has a proved area of 3,000 surface acres and has produced 21,631,000 barrels of oil to January 1, 1942.

The field is located on strike with the most prolific lower Catahoula (Frio) sand fields of the Coastal Bend province. The sand conditions are excellent along this strike and reach their maximum thickness a short distance downdip from the Plymouth field. The structure is an elongate flat dome of moderately low relief. The maximum proved closure is approximately 100 feet. The dome is bounded on the southwest flank by a graben. The structural uplift is probably caused by a deep, buried salt core. The dome becomes more pronounced and steeper with depth; on the Greta sand there is only a broad nosing, on the 5,600-foot sand there is a broad flat dome, but on the 6,100-foot sand there is a very pronounced doming with steeper dips. There is good evidence of at least one erosional unconformity.

There are four producing oil sands: (1) Plymouth sand, 5,500 feet; (2) Heep sand, 5,600 feet; (3) Magnolia sand, 5,800 feet; (4) 6,100-foot sand. Of these, the Heep is the most important oil reservoir.

27. CHARLES E. DECKER, University of Oklahoma, Norman, Oklahoma
A Silurian Graptolite Zone in Crane County, Texas

In June, 1941, William Hilseweck of the Gulf Oil Corporation of Fort Worth, Texas, sent the writer a piece of core from a well taken at a depth of 9,340 feet in Crane County, Tesas. While he did not determine the species, he correctly concluded that the graptolites on the core proved the presence of a Silurian zone for one which had commonly been called Devonian. A few fragments of graptolites occur on the surface of the core, but they have sufficiently diagnostic characteristics to identify the species. The stratigraphic conditions are noted, and the species is illustrated and described. Also, it is compared with specimens of the same species which were sent to the writer from the Chicago region by Alfred and Helen Loeblich.

28. F. R. DENTON, Consulting Geologist, Tyler, Texas
R. M. TROWBRIDGE, Consulting Geologist, Tyler, Texas
Developments in East Texas during 1941

The marked increase in exploratory tests in East Texas during 1941 resulted in the discovery of three oil fields. Two of these fields are producing from the Woodbine formation and one from the Rodessa zone of the lower Glen Rose formation.

In the Hawkins field, which was the major 1940 discovery, a rapid development program took place and 243 oil wells, 3 gas wells, and 8 dry holes were drilled.

The number of completions in other proved fields exceeded that of 1940.

29. O. L. BRACE, Consulting Geologist, Houston, Texas
Review of Developments in 1941, Gulf Coast of Upper Texas and Louisiana

More refined methods of oil exploration have resulted in a slight increase in the discovery rate on the Texas Gulf Coast for 1941 but the generally second-grade type of individual pool that has resulted from exploratory activity during the past few years still characterizes the discovery column. Coastal Louisiana has had a successful year, with 17 new productive areas but there is no one of these that seems at this time to compare with some of the outstanding discoveries of recent years.

Activity along the Eocene Wilcox trend has been rather successful in Texas for